AUXILIARY EQUIPMENT PART I

Attempt ALL questions
Marks for each part question are shown in brackets

1. (a) State, with reasons, the type of valve that should be used in EACH of the following situations:

   (i) isolating valve within a fire main; (2)

   (ii) main engine stand-by cooling water circulating pump discharge. (2)

   (b) With reference to a fuel service tank outlet valve:

   (i) describe its operation; (4)

   (ii) state the reason for the operation in part (b)(i). (2)

2. (a) State FOUR types of pumps suitable for use in a hydraulic system. (4)

   (b) Explain why the pumps stated in part (a) are suitable for hydraulic systems. (6)

3. With reference to reciprocating air compressors:

   (a) state the meaning of the term *bump clearance*; (2)

   (b) explain the effects on operation if the bump clearance is:

   (i) too large; (3)

   (ii) too small. (3)

   (c) explain how an aftercooler helps remove moisture from the air. (2)

4. With reference to hydraulic systems:

   (a) state FOUR applications for a hydraulic system on board a vessel; (4)

   (b) state the effects and possible causes of EACH of the following:

   (i) air in the system; (2)

   (ii) dirt and foreign particles in the system; (2)

   (iii) separated water in the system. (2)

5. With reference to an electro-hydraulic steering gear, explain EACH of the following:

   (a) how steering may be maintained should the telemotor system fail; (5)

   (b) how steering may be achieved should there be total failure of the hydraulic system. (5)

6. Describe, with the aid of a sketch, the operation of a transverse thruster that is hydraulically driven. (10)

7. Describe, with the aid of sketches, the fitting of a hydraulically tensioned bolt suitable for main propulsion shaft flanges. (10)

8. With reference to intermediate shaft bearings of the roller type, describe, with the aid of a sketch, EACH of the following:

   (a) how some angular misalignment of the shaft is accommodated; (5)

   (b) how longitudinal movement of the shaft is accommodated. (5)

9. With reference to electrical maintenance:

   (a) explain the procedure for proving a motor circuit is isolated using a multimeter; (5)

   (b) explain the procedure for testing the insulation resistance and earth bonding of the motor, giving examples of acceptable readings. (5)

10. (a) Sketch a block diagram of the layout of a vessel electrical distribution system for 440/220 V, including the main and emergency generators. (7)

    (b) Describe the MCA recommended procedure for testing the Emergency Alternator. (3)